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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/682,443	09/04/2001	Michiel Jacques van Nieuwstadt	200-1758 JDR	9487

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EXAMINER

NGUYEN, TU MINH

ART UNIT	PAPER NUMBER
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3748

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DATE MAILED: 04/04/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.
09/682,443

Applicant(s)
Michiel Jacques Van Nieuwstadt

Examiner
Tu M. Nguyen

Art Unit
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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on _____
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above, claim(s) _____ is/are withdrawn from consideration
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on Sep 4, 2001 is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☐ All b) ☐ Some* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- *See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- 15) ☒ Notice of References Cited (PTO-892) 18) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 19) ☐ Notice of Informal Patent Application (PTO-152)
- 17) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s). 2 20) ☐ Other:

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DETAILED ACTION

Drawings

1. The drawings are objected to because in Figure 2, numeral 29 at the decision block to compare T_EXO and T_EXO_THRES should be removed since numeral 29 is already used in a multiplier block. Correction is required.

Specification

2. The abstract of the disclosure is objected to because on line 5, "here" should be removed. Correction is required. See MPEP § 608.01(b).
3. The disclosure is objected to because on
 - Page 4, paragraph 0012, line 1, "/" should read --.--.
 - Page 4, paragraph 0014, the sentence is incomplete.Appropriate correction is required.

Claim Objections

4. Claims 4, 6, and 8 are objected to because of the following informalities:
 - Claim 4, line 4 of the claim, "and" should be deleted.
 - Claim 6, line 5 of the claim, --and-- should be inserted following "threshold;".
 - Claim 8, line 1 of the claim, "12" should read --7--.Appropriate correction is required.

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Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office Action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

6. Claims 1-9 are rejected under 35 U.S.C. 102(b) as being anticipated by Hirota et al. (U.S. Patent 5,201,802).

Re claims 1-3, as shown in Figures 6 and 14-18, Hirota et al. disclose a method for controlling hydrocarbon injection into an engine exhaust to reduce NO_x in such exhaust, such engine exhaust with the NO_x and the injected hydrocarbon being directed to a catalyst (6) for reaction therein, comprising:

(a) detecting an exothermic reaction based on a temperature difference (Δt) across the catalyst (step 608); and

(b) injecting the hydrocarbon into the detected exothermic reaction in accordance with the temperature difference (steps 618 and 620; also see Figure 18 and line 10 of column 9 to line 3 of column 10) (the hydrocarbon concentration H1 is a function of Δt because DR is a function of D (Figure 16) which is a function of Δt (step 610)).

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4-6

Re claims ~~4 and 5~~, as illustrated in Figures 6 and 14-18, Hirota et al. disclose a method for controlling hydrocarbon injection into an engine exhaust to reduce NOx in such exhaust, such engine exhaust with the NOx and the injected hydrocarbon being directed to a catalyst (6) for reaction therein, comprising:

(a) detecting a temperature difference (Δt) indicating an exothermic reaction across the catalyst (step 608);

(b) comparing the temperature difference with a predetermined temperature threshold (ΔT_i) (step 610);

(c) determining an exothermic condition temperature (T_2) at an output of the catalyst when the temperature difference is determined to exceed the threshold (step 614, Figure 17); (if $D = (\Delta T_i - \Delta t)$ is non zero,

(d) comparing the determined exothermic condition temperature with an exothermic condition temperature (550 in Figure 17) expected from the catalyst at a time prior to the determined exothermic condition temperature; and

(e) modifying the injected hydrocarbon in accordance with the comparison (steps 618 and 620; also see Figure 18 and line 10 of column 9 to line 3 of column 10) (Hirota et al. determine in advance a desired lower limit catalyst inlet temperature T_1 and a desired upper limit catalyst outlet temperature T_2 for the optimum reduction of NOx as a function of the degradation extent DR (Figure 17). For a non-deteriorated catalyst, T_1 and T_2 equal 450 and 550, respectively. If a detected temperature difference (Δt) across the catalyst is different from a predetermined temperature threshold (ΔT_i), a degradation extent DR is calculated (step 612); and a set of

↑
on other words, if T_2 is different from 550

$$HC = f_{cat}(DR) = f_{cat}(D)$$

$$= f_{cat}(T_2, 550)$$

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desired temperature values T1 and T2 are determined based on the calculated DR (step 614). A hydrocarbon concentration H1 is also determined based on DR).

Re claim 6, as illustrated in Figures 6 and 14-18, Hirota et al. disclose a method for determining peak efficiency temperature of a catalyst (6) in reducing NOx wherein such NOx is reduced by reacting such NOx in the catalyst with a hydrocarbon, comprising:

- (a) detecting a temperature difference (Δt) across the catalyst (step 608);
- (b) comparing the temperature difference with a predetermined temperature threshold (ΔT_i) (step 610); and
- (c) determining an exothermic condition temperature (T2) at an output of the catalyst when the temperature difference is determined to exceed the threshold (step 614 and Figure 17; also see Figure 7).

Re claim 7, as shown in Figures 6 and 14-18, Hirota et al. disclose a system for controlling hydrocarbon injection into an engine exhaust to reduce NOx in such exhaust, such engine exhaust with the NOx and the injected hydrocarbon being directed to a catalyst (6) for reaction therein, comprising:

- (a) a catalyst (6) for facilitating a reaction between the injected hydrocarbon and NOx in the exhaust;
- (b) a hydrocarbon injector (14) for injecting the hydrocarbon into the exhaust upstream of the catalyst;

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(c) a detecting system comprising:

- a pair of detector (24, 20) each detecting a common parameter in the exhaust, one of such sensors being upstream of the catalyst and the other one of the sensors being downstream of the first sensor; and
- a processor (10) for controlling the hydrocarbon injector in response to the pair of sensors.

Re claim 8, in the system of Hirota et al., the common parameter is temperature and wherein the detectors are temperature detectors.

Re claim 9, as illustrated in Figures 6 and 14-18, Hirota et al. disclose a processor (10) for controlling hydrocarbon injection into an engine exhaust to reduce NOx in such exhaust, such engine exhaust with the NOx and the injected hydrocarbon being directed to a catalyst (6) to facilitate reaction between the injected hydrocarbon and the exhaust NOx, such processor being programmed to provide a control signal to a hydrocarbon injector (14) to inject the hydrocarbon into the exhaust upstream in response to output signal from a pair of sensors (24, 20), each of the pair of sensors being adapted detecting a common parameter (temperature) in the exhaust, one of such sensors being upstream of the catalyst and the other one of the sensors being downstream of the first sensor.

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7. Claims 1-4 and 7-9 are further rejected under 35 U.S.C. 102(e) as being clearly anticipated by King et al. (U.S. Patent 6,167,698).

King et al. disclose a method, a system, and a processor for controlling hydrocarbon injection into an engine exhaust to reduce NO_x in such exhaust, that disclose all of the features and limitations as claimed.

8. Claims 1-4 and 7-9 are further rejected under 35 U.S.C. 102(b) as being clearly anticipated by Kibe (U.S. Patent 5,842,341).

Kibe discloses a method, a system, and a processor for controlling hydrocarbon injection into an engine exhaust to reduce NO_x in such exhaust, that disclose all of the features and limitations as claimed.

Prior Art

9. The IDS (PTO-1449) filed on October 9, 2001 has been considered. An initialized copy is attached hereto.

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure and consists of four patents.

- Maus et al. (U.S. Patent 5,428,956) disclose a method for monitoring the catalytic activity of a catalyst in the exhaust gas system of an internal combustion engine.

- Sultan (U.S. Patent 5,706,652) discloses a catalyst monitor method and apparatus.

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- Maus et al. (U.S. Patent 5,751,602) disclose a method for monitoring the operation of a catalyst.

- Borland (U.S. Patent 6,357,226) discloses a control system for lean air-fuel ratio NOx catalyst system.

Communication

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Tu Nguyen whose telephone number is (703) 308-2833.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Thomas E. Denion, can be reached on (703) 308-2623. The fax phone number for this group is (703) 308-7763.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-1148.

TMN

April 1, 2002

Tu M. Nguyen

Tu M. Nguyen

Patent Examiner

Art Unit 3748

Thomas Denion
THOMAS DENION
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